

REMARKS

The Final Office Action mailed June 17 , 2003, has been carefully reviewed and by this Amendment, Applicants have amended claim 15. Claims 1 and 5-15 are pending in the application.

The Examiner rejected claims 1, 12 and 13 under 35 U.S.C. 103(a) as being unpatentable over U.S. Publication No. US 2002/0187434 to Blatchford in view of U.S. Patent No. 6,458,284 to Kashihara and U.S. Patent No. 6,150,263 to Lin. The Examiner also rejected claims 5-11 and 14 as being unpatentable over Blatchford in view of Kashihara or Lin, and further in view of Wolf and Tauber, "Silicon Processing for the VLSI Era" ("Wolf and Tauber").

As set forth in claims 1 and 15, the present invention is directed to a method of manufacturing a narrow bit line by successively forming a conducting layer and an insulating layer on a substrate, forming a photoresist film on the insulating layer, and etching the photoresist film using a photolithography process to form a first mask pattern on the insulating layer. The first mask pattern is etched by an isotropic dry etching so as to form a second mask pattern, *with the isotropic dry etching being carried out with plasma dry etching equipment which uses a microwave energy source*. Part of the insulating layer is removed by a first anisotropic dry etching process using the second mask pattern, after which the second mask pattern is removed and the conducting layer is etched by a second anisotropic dry etching using the remaining insulating layer, so as to form the bit line.

As admitted by the Examiner, neither Blatchford nor Blatchford in view of Kashihara or Lin teach etching the first mask pattern by isotropic dry etching to form the second

mask pattern, the isotropic dry etching being carried out with plasma dry etching equipment which uses a microwave energy source. Instead, Blatchford discloses removing the near surface region 120 by an isotropic liquid etchant [0021], while Kashihara teaches wet etching the TiSiN film 1a using a mixture of hydrofluoric acid and hydrogen peroxide solution (column 9, lines 37-47). Finally, Lin discloses removing a peripheral part of the bit line pattern 140a' by isotropic etching process using a solution that comprises ammonia and hydrogen peroxide (column 3, lines 1-7).

The teaching of Wolf and Tauber, while generally teaching the known techniques of isotropic and anisotropic etching, does not disclose or suggest this particular isotropic dry etching process and power source in combination with the other steps currently being claimed. Furthermore, Applicants have not been able to find in Wolf and Tauber any specific teaching on the use of a microwave energy source in an isotropic dry etching process in the manner claimed. The page number noted by the Examiner relating to Organic Films seems to be limited to the use of CF₄ gas and oxygen for etching resist materials. Should the Examiner maintain his rejection, the Examiner's assistance in identifying the specific teaching in Wolf and Tauber directed to the use of a microwave energy source in an isotropic dry etching process in the manner claimed by the present invention is requested.

Finally, there is nothing in the prior art to suggest the particular combination of elements set forth in claims 1 and 15. That various dry and wet techniques are known per se does not make them fully interchangeable, as each has advantages and disadvantages (see Wolf and Tauber) making it more or less suitable for particular applications. Therefore, one of ordinary skill

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in the art would not find it obvious to substitute one for the other in the absence of a specific suggestion to do so, which is not provided by the prior art.

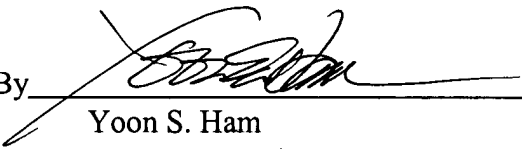
Based on the foregoing and the absence of teaching in the art relating to isotropic dry etching of the first mask pattern to form the second mask pattern, with such isotropic dry etching being carried out with plasma dry etching equipment which uses a microwave energy source, Applicants request reconsideration and allowance of claim 1 and amended claim 15, as well as the claims dependent thereon.

No new issues being raised herein and the foregoing Amendment placing the application into condition for allowance, entry of the Amendment is proper and respectfully requested.

With this Amendment, the application is in condition for allowance. Should the Examiner have any questions or comments, the Examiner is cordially invited to telephone the undersigned attorney so that the present application can receive an early Notice of Allowance.

Respectfully submitted,

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